

N 8 9 - 2 8 1 1 9

189857
51-32
ABSONEY

OCEAN TOPOGRAPHY EXPERIMENT (TOPEX) RADAR ALTIMETER

P-3

by

L. C. Rossi, D. W. Hancock, and G. S. Hayne (672)

Our involvement with the TOPEX Radar Altimeter allows us to contribute to the advancement of oceanographic research by participating in the NASA TOPEX Mission in the areas of space-flight hardware and ground data processing algorithm development.

We are assisting the Jet Propulsion Laboratory's (JPL) TOPEX Flight Project Office in the execution of the TOPEX Flight Mission relative to the requisite spaceflight hardware and supporting data reduction algorithms that will be required. Specifically, we are providing a spaceflight qualified Radar Altimeter capable of achieving the TOPEX Mission measurement precision requirement of 2-centimeters, and will evaluate its performance (Engineering Assessment) after launch and continuously during its 3-year mission operational period. We will be providing to JPL information about the calibration of the TOPEX Radar Altimeter. We will provide the specifications for the required data processing algorithms which will be necessary to convert the Radar Altimeter mission telemetry data into the geophysical data. We will participate in the validation of these geophysical data prior to their initial release to the TOPEX Principal Investigators and at periodic intervals during the TOPEX Mission.

PRECEDING PAGE BLANK NOT FILMED

The stringent 2-centimeter precision requirement for ocean topography determination from space necessitated examining existing Radar Altimeter designs for their applicability towards TOPEX. As a result, a system configuration evolved using some flight proven designs in conjunction with needed improvements which include: 1) a second frequency or channel to remove the range delay or apparent height bias caused by the electron content of the ionosphere; 2) higher transmit pulse repetition frequencies for correlation benefits at higher sea states to maintain precision; and 3) a faster microprocessor to accommodate two channels of altimetry data. Additionally, examination of past altimeter programs associated data processing algorithms was accomplished to establish the TOPEX-class Radar Altimeter data processing algorithms, and the necessary direction was outlined to begin to generate these for the TOPEX Mission.

The Johns Hopkins University Applied Physics Laboratory (JHU/APL) over the period FY83-FY86 completed the TOPEX Advanced Technology Model (ATM) Radar Altimeter. Since the last Activities Report, partial testing of the ATM provided evidence that 2-centimeter precision altimetry from space is achievable with the design concept chosen for the flight TOPEX Radar Altimeter. The necessary administrative arrangements to obtain the support of The JHU/APL for the development of this flight Radar Altimeter were accomplished during the first half of FY87, and their Flight Unit development efforts were initiated in the fourth quarter FY87. APL's major emphasis during the remainder of FY87 was the establishment of a new Radar Altimeter flight configuration

compatible with the TOPEX spacecraft selected by the Project and the conduct of Radar Altimeter Preliminary design activities. Development of the specifications for the flight TOPEX Radar Altimeter ground data reduction algorithms was initiated by GSFC's Code 672. The TOPEX Project sponsored Data Workshops with the TOPEX Science community concerning data processing were actively supported during FY87.